

**What is claimed is:**

1. A method of making a quartz-shell drum comprising the steps of:

heating a quartz tube to a temperature at least sufficient to enable quartz to flow;

5 enlarging a diameter of a portion of the heated quartz tube to a predetermined size;

cutting the enlarged tube perpendicular to a longitudinal axis to create a shell having a desired height;

grinding a top edge and a bottom edge of the shell to form smooth radii;

10 fusing the top and the bottom edges to create top and bottom rounded edges;

and

affixing a top and a bottom head to the top and the bottom edges, respectively.

15 2. The method recited in Claim 1, wherein the quartz tube heating step comprises heating the quartz tube using a high-temperature hydrogen/oxygen torch.

3. The method recited in Claim 2, wherein the torch is used to heat the quartz tube to approximately 2300°C.

20 4. The method recited in Claim 2, wherein the heating step comprises heating a central portion of the quartz tube, and the diameter-enlarging step comprises:

prior to the heating step, affixing a headstock end of the quartz tube for rotation to a glass lathe, leaving a tailstock end opposed to the headstock end decoupled from lathe rotational motion;

during the heating step, rotating the heated quartz tube using the lathe, applying centripetal acceleration for permitting a wall of the quartz tube to spread outward, thereby enlarging the quartz tube diameter along the central portion, leaving a diameter at the headstock and the tailstock ends smaller than the central portion diameter; and

when the quartz tube diameter reaches a predetermined size, stopping the lathe rotation.

**5.** The method recited in Claim 4, wherein the diameter-enlarging step further comprises, prior to the rotating step, affixing a diameter-controlling means at a predetermined distance from the quartz tube longitudinal axis, the predetermined distance selected to limit an enlargement of the quartz tube central portion diameter to the predetermined size.

**6.** The method recited in Claim 5, wherein the diameter-controlling means comprises a graphite roller affixed for rotation to a support, a longitudinal axis of the roller substantially perpendicular to the quartz tube longitudinal axis, the roller positioned to control the central portion diameter.

**7.** The method recited in Claim 6, wherein the diameter-controlling means further comprises means for rotating the roller and a cooling bath positioned to encompass a lower portion of the roller, the bath adapted to hold a cooling fluid through which the roller is rotatable by the rotating means.

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**8.** The method recited in Claim 4, further comprising the step, prior to the cutting step, of separating the quartz tube central portion from the headstock end.

**9.** The method recited in Claim 8, wherein the separating step comprises using  
10 the torch to heat a location adjacent an end of the central portion adjacent the headstock end sufficiently to enable the central portion to be pulled apart therefrom.

**10.** The method recited in Claim 1, further comprising the step, following the enlarging step, of reheating the tube.

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**11.** The method recited in Claim 1, wherein the cutting step comprises affixing the central portion for rotation to a cutting machine having a diamond wheel thereon.

**12.** The method recited in Claim 1, wherein the grinding step comprises using a  
20 belt grinder and then hand grinding.

**13.** The method recited in Claim 1, further comprising the steps of cleaning the shell in ammonium bifluoride following the grinding step, and washing and drying the shell.

**14.** The method recited in Claim 1, wherein the fusing step comprises heating the top and the bottom edges with a torch to seal and fuse the quartz;

**15.** The method recited in Claim 1, further comprising the step, following the fusing step, the steps of cleaning the shell and annealing the cleaned shell in an annealing oven.

**16.** A quartz-shell drum made by the method of Claim 1.

**17.** A method of making a quartz-shell drum comprising the steps of:

heating a quartz tube;

enlarging a diameter of a portion of the heated quartz tube to a predetermined size;

cutting the enlarged tube perpendicular to a longitudinal axis to create a shell having a desired height;

grinding a top edge and a bottom edge of the shell to form a smooth radius on the bottom edge and an inwardly angled top edge;

fusing the top and the bottom edges to create top and bottom rounded edges; and

affixing a top and a bottom head to the top and the bottom edges,  
respectively.

**18.** A quartz-shell drum made by the method of Claim 17.